

Official Amendment

Serial No. – 10/625,886

Docket No. – UVD 0299 IA / UD 268

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REMARKS

Claims 1-166 were pending in the present application. Claims 1, 10, and 137 have been amended, and claims 9, 12-34, 56-136, and 138-139 have been canceled. Claims 39, 40, 48-50, were withdrawn from consideration. New claims 140-164 have been added. As a result of this amendment, claims 1-8, 10-11, 35-38, 41-47, 51-55, 137, and 140-164 are pending. Reexamination and reconsideration are requested in light of the accompanying amendments and remarks.

The rejection of claims 1-7, 9-11, 35-38, 41-42, 44-47, 51-55, and 137 under 33 U.S.C. § 103(a) as being unpatentable over PCT publication WO 98/48075 (treated as equivalent to U.S. Patent No. 6,200,672 to Tadokoro) in view of U.S. Application 2003/0185990 (Bittner) has been overcome. Tadokoro teaches "a surface treated metal sheet which is coated with a layer comprising as main components, *a complex and/or salt between a rare earth metal element and an organic compound* having in the molecule one or more functional groups selected from among -O-, =O, -OH, -COOH, -NH₂, -NH, =N-, -SH, -SO₃H and phosphoric groups, and a *matrix which physically holds the above and has adhesive power for metal sheets*, as well as a metal surface treatment solution used therefore." Abstract.

According to the examiner, "Tadokoro teaches an aqueous metal surface treatment fluid comprising a rare earth element such as tetravalent cerium (col. 5 lines 6-9) and oxyacid anions such as phosphate, tungstate, vanadate anions, wherein the rare earth metal elements and the oxyacid anions form oxyacid compounds (col. 9 lines 28-33)." However, col. 5, lines 6-9, and col. 9, lines 28-33 refer to different components of the coating. One component is a *complex and/or salt* between a rare earth element and an organic compound having certain functional groups (rare earth metal complex). The second component is a *matrix* capable of holding the rare earth metal complex and having adhesive power for metal sheets. See Abstract, col. 3, lines 12-20 and 61-67, col. 13, lines 43-55, and Tables 1 and 2.

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The discussion at col. 5, lines 6-9 refers to the first component, the rare earth metal complex. See col. 4, line 52 to col. 5, line 35, and col. 10, line 64 to col. 11, line 48. The discussion at col. 9, lines 28-33 refers to the second component, the matrix. See col. 7, lines 46-60, col. 9, lines 26-43, col. 10, lines 4-8, col. 12, line 43 to col. 13, line 42.

The examiner also stated that “Tadokoro further teaches a rare earth metal complex comprising rare earth elements such as tetravalent cerium and an inorganic compounds [sic] such as phosphates, nitrates and sulfates (col. 5 lines 27-31).” However, col. 5, lines 27-31 does not refer to a complex between a rare earth metal and an inorganic compound. As explained at col. 5, lines 24-27, the rare earth metal complex (i.e., the complex and/or salt between a rare earth element and an *organic* compound) can have an inorganic compound as a ligand. “In the case of a complex, there is no problem if it *also contains an inorganic compound as a ligand in addition to the organic compound.*”

Tadokoro does not teach that “the valence stabilizer consists essentially of an inorganic valence stabilizer,” as claimed. Tadokoro’s complex or salt is between a rare earth element and an *organic* compound. See Abstract; col. 2, lines 38-46, 52-61; col. 2, lines 12-20, 33-39, and 61-67; col. 4, lines 13-20; col. 5, lines 10-31; col. 6, line 40 to col. 7, line 13.

With respect to claims 1 and 9-11, the examiner stated that “the tetravalent cerium of Tadokoro in view of Bittner reads on the claimed rare earth element and the phosphate, tungstate, vanadate, sulfate and nitrate of Tadokoro in view of Bittner read on the claimed inorganic valence stabilizer. The oxyacid compound or the rare earth metal complex of Tadokoro in view of Bittner reads on the claimed rare earth/valence stabilizer complex.” As discussed above, Tadokoro teaches a complex or salt between a rare earth metal and an *organic* compound.

According to the examiner, “applicant’s argument [is not] persuasive since Tadokoro teaches that the rare earth complex also contains an inorganic compound as a ligand (col. 5 lines 24-27). Therefore, Tadokoro seems to include the inorganic compound, even though function as a ligand, as part of the rare earth complex.” However, Tadokoro does not teach that “the valence

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stabilizer consists essentially of an inorganic valence stabilizer,” as claimed. Tadokoro’s complex or salt is between a rare earth element and an *organic* compound.

Bittner is cited as teaching a method for coating a metal surface with a paint-like coating comprising at least one rare earth element compound (paragraphs [0110], [0116]), and that the metal substrate can be pretreated with phosphate to provide temporary protection of the metal surface (paragraph [0007]). However, Bittner does not remedy the deficiencies of Tadokoro.

With respect to claim 7, the examiner stated that “since Tadokoro in view of Bittner teach a rare earth metal complex, the claimed central cavity containing cerium is inherently present in the rare earth metal complex. In addition, since specifics of the additional ions are not recited in the claim, any ions, such as impurities in the cavity of the rare earth metal complex, can read on the claimed additional ion.”

As discussed on p. 170, lines 1-19, in the case of the heteropolymetallates, there is a central cavity which can contain an ion in addition to cerium. Examples include silicomolybdates, phosphomolybdates, silicotungstates, and phosphotungstates. In these complexes, the central cavity contains a Si^{+4} or P^{+5} ion in addition to the cerium ion. The molybdenum or tungsten is not in the central cavity; rather, it forms the central cavity. Thus, in a cerium/vanadate complex as described in Tadokoro, the vanadium ion is not in the central cavity.

As to the statement that impurities in the cavity of the rare earth complex can read on the additional ion, the Office Action provides no support for the assertion that impurities in the rare earth metal complex would or could be located in the central cavity.

With respect to claims 35-38, the examiner stated that “Tadokoro teaches the presence of cerium ions which read on the claimed cationic solubility control agent. Tadokoro further teaches the presence of calcium, zinc, lanthanum, hydrogen, zirconium, and titanium ions (col. 10, lines 9-18) which also read on the claimed cationic solubility control agent.”

Tadokoro does not teach that “the rare earth/valence stabilizer complex further comprises a solubility control agent,” as claimed. As discussed at p. 340, line 29 to p. 341, line 24, one of the roles of the valence stabilizer is to allow for formation of a tetravalent cerium,

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praseodymium, or terbium complex that has a specific solubility range. The anions or cations present in the coating solution may be sufficient to form a Ce^{+4} , Pr^{+4} , or Tb^{+4} -containing compound within the conversion coating that exhibits the desired solubility characteristics. Additional solubility control may be desirable to optimize the performance of the tetravalent cerium-, praseodymium-, or terbium-valence stabilizer complex. The initial formation of the conversion coating may produce Ce^{+4} , Pr^{+4} , or Tb^{+4} compounds with solubilities greater than optimal. Additional solubility control agents applied to a workpiece can enhance the Ce^{+4} , Pr^{+4} , or Tb^{+4} content of the coating by forming more insoluble compounds in place. Additional solubility control agents are typically applied as a second solution.

Tadokoro teaches that the layer and the treatment solution can include some additional materials.

There may also be added to the layer and treatment solution of the invention phosphoric acid or polyphosphoric acid as *passivation layer-forming aids*, or calcium hydroxide, calcium carbonate, calcium oxide, zinc phosphate, potassium phosphate, calcium phosphate, lanthanum phosphate, lanthanum hydrogen phosphate, cerium phosphate, cerium hydrogen phosphate, calcium silicate, zirconium silicate, aluminum phosphate, zirconium phosphate, TiO_2 , SiO_2 , Al_2O_3 , La_2O_3 , CeO_2 , etc. as *additional additives*.

Col. 10, lines 10-18. Tadokoro teaches the use of certain compounds as passivation layer-forming aids, and others as additional additives in its layer. Tadokoro's compounds are not solubility control agents. They do not alter the solubility of the cerium-, praseodymium-, or terbium-valence stabilizer complex. They are simply additional components in the layer.

According to the examiner, "applicant's argument [is not] persuasive since Tadokoro teaches the claimed cerium, calcium, zinc, lanthanum, hydrogen, zirconium and titanium ions present in its coating composition Therefore, their function as a solubility control agent is inherently present in these cations." However, the additional compounds included in Tadokoro's composition do not form part of the rare earth/valence stabilizer complex, as claimed.

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Therefore, claims 1-7, 9-11, 35-38, 41-42, 44-47, 51-55, and 137 would not have been obvious to one of ordinary skill in the art at the time the invention was made over Tadokoro in view of Bittner.

The rejection of claim 43 under 33 U.S.C. § 103(a) as being unpatentable over Tadokoro in view of Bittner and further in view of Gulley (U.S. Patent No. 5,330,588) has been overcome. Gulley is cited as teaching “the use of silver in a chemisorption layer on a metal part as a lubricant in order to averts [sic] high frictional forces.” However, Gulley does not remedy the deficiencies of Tadokoro combined with Bittner. Therefore, claim 43 would not have been obvious to one of skill in the art at the time the invention was made over Tadokoro in view of Bittner and further in view of Gulley.

The rejection of claims 1-7, 9-11, 35-38, 41-42, 44-47, and 137 under 33 U.S.C. § 102(b) [sic] as being unpatentable over DePue (U.S. Patent No. 5,322,560) in view of Bittner is respectfully traversed. DePue teaches a corrosion inhibitor compound for treating aluminum flake pigment. The corrosion inhibitor compound is the reaction product of a water-soluble metal salt including metals selected from the group consisting of yttrium and rare earth metals and an anionic metal salt including transition metal oxo-complexes and soluble salts of silicon and mixtures thereof. Abstract.

According to the examiner, DePue teaches that the “corrosion inhibitor compound comprises a rare earth metal such as tetravalent cerium (col. 2 lines 55-60), a silicon salt and a metal oxo-complexes [sic] of Ti, V, Cr, Zr, Nb, Mo, Hf, Ta, and W (col. 2 lines 27-36, col. 3 lines 17-22).”

The corrosion inhibitor of DePue is described at col. 2, lines 27-36, and col. 3, lines 17-22. However, the compounds described at col. 2, lines 55-59 are different compounds (water-soluble) which can be used as primary corrosion inhibitors in combination with DePue’s claimed corrosion inhibitor (slightly soluble) which would be a secondary corrosion inhibitor.

The corrosion inhibitors of the present invention are also useful when *used in combination with water-soluble metal salts of yttrium and the rare earth metals.*

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Particularly useful salts include trivalent cerium, yttrium and lanthanum salts and tetravalent cerium salts.

These salts are discussed further at col. 4, lines 34-55.

The slightly soluble corrosion inhibitor of the present invention is also useful in aqueous coating compositions containing aluminum flake pigment. The corrosion inhibitor is particularly effective in coating compositions when used as a secondary corrosion inhibitor in combination with *a primary corrosion inhibitor which is a water-soluble salt of trivalent or tetravalent salt of cerium, yttrium or lanthanum.* Water-soluble salts useful as a primary corrosion inhibitor compound for treating the aluminum pigment include cerium sulfate, cerium triacetate, cerium isopropoxide, ammonium cerium nitrate, yttrium triacetate, lanthanum triacetate and cerium nitrate.

When used in combination in a coating composition, *the water soluble metal salt used as the primary corrosion inhibitor* is present in an amount of between 0.01% and 5.0% by weight based on total pigment weight and *the slightly soluble salt used as the secondary corrosion inhibitor* is used in an amount between 0.01% and 5.0% by weight based on the combined weight of the corrosion inhibitor and pigment.

Thus, the only *tetravalent* rare earth compounds described in DePue are *salts*, not *rare earth/valence stabilizer complexes*, as claimed. The salts are highly soluble in water, and fall above the solubility parameters specified in the claims. In fact, several of the salts mentioned are identified in the application as being suitable cerium sources: cerium sulfate, cerium triacetate, ammonium cerium nitrate and cerium nitrate. See p. 349, line 21 to p. 350, line 8, and Table 4.

According to the Office Action “applicant’s argument [is not] persuasive since DePue teaches a slightly water soluble corrosion inhibitor compound which is a product of a rare earth metal salt, a metal oxo-complex and a silicon salt. The rejection ground is based on this slightly water soluble corrosion inhibitor compound in an aqueous solution as taught by DePue, which read [sic] on the claimed rare earth/valence stabilizer complex.” However, DePue’s *slightly soluble corrosion inhibitor* does not contain *tetravalent* rare earth metals. Nowhere in the

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description of the *slightly soluble corrosion inhibitor* is there any mention of a product in which the rare earth is in the *tetravalent* state or of any process which would be required to make such a compound. The only description of a product with cerium in the *tetravalent state* is with respect to the *soluble salt* (col. 4, line 34-39).

Bittner is cited as teaching a method for coating a metal surface with a paint-like coating comprising at least one rare earth element compound (paragraphs [0110], [0116]), and that the metal substrate can be pretreated with phosphate to provide temporary protection of the metal surface (paragraph [0007]). However, Bittner does not remedy the deficiencies of DePue.

With respect to claim 7, the examiner stated that “since DePue in view of Bittner teaches the claimed rare earth/valence stabilizer complex, it also inherently teaches the central cavity containing cerium as recited in instant claim 7. In addition, since specifics of the additional ions are not recited in the claim, any ions, such as impurities in the cavity of the rare earth metal complex, can read on the claimed additional ion.”

As discussed on p. 170, lines 1-19, in the case of the heteropolymetallates, there is a central cavity which can contain an ion in addition to cerium. Examples include silicomolybdates, phosphomolybdates, silicotungstates, and phosphotungstates. In these complexes, the central cavity contains a Si^{+4} or P^{+3} ion in addition to the cerium ion. The molybdenum or tungsten is not in the central cavity; rather, it forms the central cavity.

As to the statement that impurities in the cavity of the rare earth complex can read on the additional ion, the Office Action provides no support for the assertion that impurities in the rare earth metal complex would or could be located in the central cavity.

With respect to claims 35-38, DePue does not teach the use of solubility control agents as claimed. As discussed above, one of the roles of the valence stabilizer is to allow for formation of a tetravalent cerium, praseodymium, or terbium complex that has a specific solubility range. The anions or cations present in the coating solution may be sufficient to form a Ce^{+4} , Pr^{+4} , or Tb^{+4} -containing compound within the conversion coating that exhibits the desired solubility characteristics. Additional solubility control may be desirable to optimize the performance of the

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tetravalent cerium-, praseodymium-, or terbium-valence stabilizer complex. The initial formation of the conversion coating may produce Ce^{+4} , Pr^{+4} , or Tb^{+4} compounds with solubilities greater than optimal. Additional solubility control agents applied to a workpiece can enhance the Ce^{+4} , Pr^{+4} , or Tb^{+4} content of the coating by forming more insoluble compounds in place. Additional solubility control agents are typically applied as a second solution.

The examiner stated that “DePue further teaches the presence of Na ions from the metal oxo-complexes (col. 3 lines 17-22), which reads on the cationic solubility control agent as claimed. In addition, the Ce, Ti, Zr, V, Cr, W, Mo, Nb, Hf, Ta as taught by DePue in view of Bittner also read on the claimed cationic solubility control agent.” Applicants are unable to find any listing of Ce, Ti, Zr, V, Cr, W, Mo, Nb, Hf, Ta in DePue. Therefore, Applicants respectfully request clarification with respect to specifically where in DePue these materials are shown.

Applicants note the listing of titanium, vanadium, chromium, zirconium, niobium, molybdenum, hafnium, tantalum, and tungsten (not cerium) at col. 2, lines 27-36 and col. 3, lines 12-16. However, those are listings of transition metals for the soluble salts of transition metal oxo-complexes. As such, they would not be available for use as solubility control agents. Applicants also note the recitation of cerium nitrate as the preferred water-soluble metal salt for reaction with the anionic metal salt. However, the cerium reacts with the metal salt and would not be available for use as a solubility control agent.

Therefore, claims 1-7, 9-11, 35-38, 41-42, 44-47, and 137 would not have been obvious to one of ordinary skill in the art over DePue in view of Bittner.

The rejection of claim 43 under 33 U.S.C. § 103(a) as being unpatentable over DePue in view of Bittner and further in view of Gulley (U.S. Patent No. 5,330,588) is respectfully traversed. Gulley is cited as teaching “the use of silver in a chemisorption layer on a metal part as a lubricant in order to averts [sic] high frictional forces.” However, Gulley does not remedy the deficiencies of DePue combined with Bittner. Therefore, claim 43 would not have been obvious to one of skill in the art at the time the invention was made over DePue in view of Bittner and further in view of Gulley.

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Applicants gratefully acknowledge the examiner's statement that claim 8 would be allowable if rewritten in independent form. Claim 8 has been rewritten in independent form as claim 140, with claims 141-164 depending from it. Therefore, these claims are allowable.

CONCLUSION

Applicants respectfully submit that, in view of the above amendment and remarks, the application is now in condition for allowance. Applicants respectfully request that claims 1-8, 10-11, 35-38, 41-47, 51-55, 137, and 140-164 be passed to allowance.

In any event, applicants request entry of the amendment because it reduces the number of claims and presents the claims in better form for appeal.

If the Examiner has any questions or comments regarding the present application, he is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,
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